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of the

CHILDREN'S HOSPITAL

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Contents

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13th and W Streets

Washington 9, D. C.

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Occasionally, the remarks and observations of guest speakers are included in this bulletin when thought to have particular interest. The proximity of the Children's Hospital to the Medical Centers of the Army, Navy and United States Public Health Service affords us the opportunity to invite many distinguished physicians to our conferences.

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BRONCHIOLITIS IN INFANTS

A Review of Twenty-Five Cases

Ralph Stiller, M.D.

During the winter season of 1946–47 we have had a moderately large number of cases of bronchiolitis (capillary bronchitis). We were particularly impressed by the rather typical picture seen on x-ray in most of these cases. This paper is an attempt to review what is presently known about bronchiolitis, to present some statistics culled from the cases diagnosed here during the past 5 months, and to discuss in some detail the x-ray diagnosis of the disease.

Blake and Cecil in 1920 first stated that bronchiolitis was a specific disease involving the bronchial and bronchiolar mucous membranes. They were able to produce the disease by the introduction into the respiratory tract of pure cultures of the influenza bacillus. Trask in the early 1930's stated that bronchiolitis merges with bronchopneumonia and that any dividing line between the two conditions is purely arbitrary. Cough cyanosis and rapid respirations associated with an irregular fever and frequent relapses are all part of the picture. Trask felt that when signs of consolidation were definite, bronchopneumonia was the most likely diagnosis while with bronchiolitis, dyspnea, fine moist scattered rales and signs of emphysema were more prominent. This emphysema is considered the distinguishing feature of the disease and produces the hyper-resonance, marked inspiratory retractions, distended abdomen and the palpable liver and spleen that are secondary to the depressed diaphragms. Trask felt that, bacteriologically, a joint action of the pneumococcus and influenza bacillus was responsible for the syndrome.

Holt speaks of the great respiratory distress, the acute onset, with fever of 100–102 degrees F., rapid labored breathing, severe cough and in some cases cyanosis. At times respirations can reach 80–100 per minute. No consolidation is noted and instead the chest is hyper-resonant and the respiratory murmur is feeble. Fine moist rales may or may not be heard throughout the entire chest. Death may occur according to this author on the 3rd or 4th day. If not there is gradual improvement as the disease merges into a full-blown pneumonia. He states that oxygen is always of help and steam is occasionally of benefit.

Nelson and Smith (1945) speak of bronchiolitis as being responsible for a generalized obstructive emphysema. The etiology can vary, and indeed from the clinical picture it is impossible to determine what causative factor is behind any particular case. Dyspnea of the expiratory type is evidence

of the emphysema. This disease causes the majority of pneumonic deaths in infants, exhaustion playing a prominent part in the death of these children. Etiologically the disease can be broken up into three groups of which the first one listed is of major importance to us here:

A. Two synergistically acting infectious agents (virus and bacteria).
B. A mechanical action plus infection (amniotic fluid, vomitus, zinc stearate, etc.).
C. The interstitial pneumonia of cystic fibrosis of the pancreas.

The chief viral agents are measles, influenza and primary atypical pneumonia. H. influenza is the prime bacterial cause.

The pathology, particularly in the viral infections with which we are chiefly concerned, consists of a destruction of the mucosal cells of the bronchiolar lining and invasion of the interstitial tissues with extension into the interalveolar septa and alveoli of the invaded area. Virus infections that persist longer than one week almost invariably go on to secondary bacterial invasion.

The disease, according to Nelson, responds well to sulfonamides. Oxygen is a valuable adjunct in the presence of cyanosis and if H. influenza is isolated, specific therapy should be used.

The twenty-five cases reviewed in this series were obtained by culling the x-ray records of Children's Hospital from September 1, 1946 to February 15, 1947 for all films diagnosed as generalized obstructive emphysema. The clinical diagnosis in all of these cases, with the exception of three, was either bronchiolitis or bronchopneumonia and, as has been stated by Trask, the dividing line between the two entities is not definite. The other three cases had positive nasopharyngeal cultures for H. pertussis. It might be mentioned here that the staccato, continuous hacking cough that is often present in bronchiolitis resembles that of pertussis and in eight of the twenty-five patients this organism was looked for. Five of these eight had negative reports on one to three cultures.

The age, sex and racial distribution may be seen in the accompanying chart (Chart 1). The age distribution is particularly striking when it is noted that 24 out of the 25 were 4 months of age or younger. The one case (14 months old) that was outside this range had a border line x-ray and clinical course that could well fit the pattern of bronchopneumonia.

The general pattern of the disease as seen here was punctuated by the relatively low fever curve; 19 cases or 76% had temperatures under 103 degrees and 64% were under 102 degrees (Chart 2). With this temperature curve there was either a normal or leucopenic white count (21 out of 25 had counts under 12,000) (Chart 3). There was a relative lymphocytosis in slightly over half the cases. Although not shown on the charts a preponderance of polymorphonuclear cells when it did occur was usually

barely over 50 while the lymphocytic response tended to be well above this in the majority of cases. The point might well be taken that this is not too significant in children of this young age group.

Cough, usually prolonged and hacking in nature, was present in all cases (Chart 4). Fine disseminated moist rales and marked dyspnea were prominent symptoms. Cyanosis, substernal and diaphragmatic retractions and asthmatic type breathing (wheezing, prolonged expiratory phase) were all present in a significant number of cases. The children all looked acutely ill and most of them were considered to be critical on admission to the

Youngest—3 weeks oldest—14 months

Age (months)	Number	Percentage
0–1	3	12%
2	11	44%
3	9	36%
4	1	4%
Over 4	1	4%

Sex:		Race:	
Male	15	White	10
Female	10	Colored	15

CHART 1

Highest temperature	Number	Percentage
Under 100°	1	4%
100°–100.8°	9	36%
101°–101.8°	6	24%
102°–102.8°	3	12%
103° and up	6	24%

CHART 2

hospital. Penicillin, 10,000 to 30,000 units every three hours and/or sulfadiazine 1½ gr. per pound of body weight per day were uniformly successful in all but one case which died shortly after admission. Unfortunately no autopsy was obtained.

It is a debatable point as to whether oxygen or steam inhalations is of greater benefit and if it is practicable both should be given. The confusion that exists concerning the efficacy of these two agents can be seen in our figures where two children received steam alone, seven received oxygen alone and four received both alternately during their hospital stay. It is our feeling that oxygen should be used in the presence of cyanosis; otherwise steam is indicated.

The major points in differential diagnosis are pertussis and asthma. Since the diagnosis of pertussis merely supplies an etiology to the same organic bronchiolar lesion we are discussing, it is important only as a guide to specific anti-pertussis therapy. If one remembers that asthma is rare under the age of six months and that over 95% of the cases of bronchiolitis occur under this age no difficulty will be encountered. The prolonged expiratory phase and wheezing are responsible for this error when it occurs. The presence of inspiratory rales plus the age of the child should lead to

WBC (23 total)	No.	Percentage	Lymphocytes over 50%
Under 7,000	3	12%	
7,000–9,000	10	40%	15 out of 23 or 65%
9,000–12,000	6	24%	
Over 12,000	4	16%	
Not recorded	2	8%	

CHART 3

Symptoms and physical signs analysis

	Number	Percentage
Cough	25	100%
Dyspnea	15	60%
Cyanosis	4	16%
Substernal retractions	5	20%
Fine scattered rales	20	80%
Distant breathing or diminished breath sounds	5	20%
Asthmatic manifestations (wheezing and/or prolonged expiration)	7	28%

CHART 4

the correct diagnosis. Adrenalin and similar therapy we have not found to be of any value.

Case report (a typical case both clinically and roentgenologically): F. T., a 3 month old colored male, was admitted to Children's Hospital on February 11, 1947 with the chief complaint of cold, cough and nasal discharge of one week's duration. Two days before admission the child became worse, rapid respirations developed and it was stated that during periods of severe coughing he turned "real dark." He had been vomiting during the 24 hours prior to admission. There was no history of diarrhea, fever or convulsions. Past history was entirely non-contributory.

Physical examination on admission revealed a well developed colored

male acutely ill with respirations of 60 per minute. There were substernal retractions. His temperature was 100 degrees. Positive findings included a patent, slightly depressed fontanelle and an injected pharynx. There were fine and medium moist rales in both lung fields anteriorly and posteriorly. There were no signs of consolidation. Urinalysis on admission was negative and a routine throat culture revealed N. catarrhalis. The blood count showed a hemoglobin of 11.5 gms., white-cell count of 7,300 with 38% neutrophils, 53% lymphocytes and 8% monocytes.

The child was placed in a croup tent and given sulfadiazine 1½ grains per pound of body weight per day. One day after admission the patient was still in respiratory distress with rapid, shallow respirations associated with periods of apnea. Bilaterally the lungs showed diminished breath sounds with numerous fine crackling rales on inspiration and expiration. There was a moderate degree of diaphragmatic retraction. X-ray revealed some low grade infiltration in the upper halves of both lungs with emphysema at the bases. Because of dehydration, sulfadiazine was discontinued and penicillin every three hours was instituted.

The child made an uneventful recovery. At no time did the temperature go above 100.4 degrees and by the third hospital day it was normal. The patient was discharged 6 days after admission.

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ACUTE GLOMERULONEPHRITIS WITH CONGESTIVE FAILURE

Case Report No. 109

J. M. Weaver, M.D. A. W. 47–9413

A. W., a 9 year old colored male, was admitted to the hospital on September 12, 1947 complaining of puffiness of the eyelids of 3 days duration, and shortness of breath during the preceding 2 nights. The patient's mother stated that he had been well until 3 days prior to admission when she noticed that his eyes were swollen, and the stomach and ankles were larger than usual. She bathed the eyes with alcohol, and the swelling seemed to subside. However, it appeared progressively worse each succeeding morning. During the two nights prior to admission the patient had been very short of breath, and had had to sit up to get air. He had been up playing about the house during the days with no distress. There had been no fever, and no nausea and vomiting. Past history revealed a normal delivery and neonatal course and a normal developmental pattern. The patient had had measles, chickenpox, mumps, and pertussis in early childhood. He had complained of headaches off and on all his life, but there had been no noticeable increase in severity or frequency recently. Three months prior to admission the patient had a gastric upset and vomited on two occasions after eating. This had not recurred.

Physical examination revealed a well developed and well nourished colored male lying comfortably ip bed in no acute distress, breathing quietly. The temperature was 100.4°, pulse 90 and respirations 22. The skin was cool and dry, with a ringworm on the lower lip and several impetiginous lesions on the anterior surface of the left leg. There was moderate adenopathy of the cervical, inguinal and epitrochlear nodes. Slight periorbital edema was noted. Pupillary reflexes were normal and fundoscopic examination showed no papilledema and no tortuosity of the vessels. Examination of the ears, nose and throat was negative. The lung fields were clear and resonant except for flatness to percussion over the right lower lobe and absence of breath sounds over this area. The heart was enlarged to the left and downward with the apex impulse in the 6th left intercostal space. Rate, rhythm and sounds were normal and no murmurs were heard. The abdomen was rounded and bulging in the flanks; it was tympanitic except over the liver area and the liver extended 8 cm. below the right costal margin, the edge being rounded and smooth. No other abdominal organs and no masses were palpable. There was slight edema of both ankles and both lower legs.

The blood pressure on admission was 172 systolic and 120 diastolic; the venous pressure was 200 mm. of water with a rise to 240 mm. of water on

pressure over the right upper quadrant. A urinalysis on the day of admission showed 20 mgm. of albumin and many white blood cells, occasional epithelial cells and much mucus. A hemogram on the same day showed 10 gm. hemoglobin, 9,800 leucocytes with 70% neutrophiles, 1% eosinophiles and 29% lymphocytes. An x-ray of the chest taken on the day after admission showed the heart diffusely enlarged and considerable congestion throughout the lung parenchyma, the appearance being that of congestive heart failure (Fig. 1). A flat plate of the abdomen showed the liver to be enlarged.

Repeated urinalyses showed traces of albumin varying in quantity from 10 to 20 mgms. with most specimens showing just a few red blood cells and

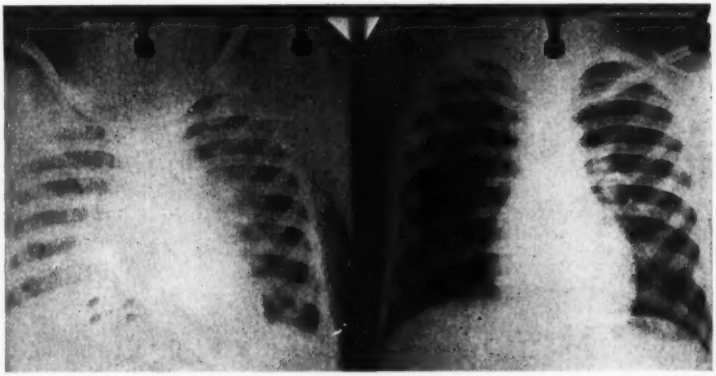

FIG. I (left). A. W.—X-ray of the chest taken upon admission illustrating the typical findings of congestive failure with cardiac enlargement and congestion of the parenchyma).

FIG. II (right). A. W.—X-ray of the chest taken one week later showing the return of the heart to normal size and disappearance of the congestion indicating compensation.

an occasional white cell. Urine upon discharge on September 30, 1947 and the five specimens preceding discharge were perfectly normal. The blood count was within normal limits and no sickling was detected upon smear. The non-protein nitrogen blood level on the fourth day after admission was 38 mgm% and the sedimentation rate was persistently elevated in the range of 31 to 36 mm. per hour. Addis count on the urine on September 21, 1947 showed a slight elevation of the number of white-cells to 579,900 for a 12 hour specimen. An intravenous pyelogram showed no evidence of abnormality and the serologic tests for syphilis were negative.

The patient's course in the hospital was very satisfactory. Complete bed rest was the only therapy used. After the second hospital day the blood

pressure dropped to 126/80 and subsequently ranged between 126/70 to 100/60. The lung fields cleared rapidly and the liver gradually returned to its normal size. The impetiginous lesions on the legs were completely healed within one week after admission. An electrocardiogram taken on September 15, 1947 showed normal axis eviation a somewhat low T 1, normal appearing T 2 and T 3. It was thought that the suspicious changes in lead 1 indicated an abnormal myocardium, consistent with acute nephritis. An x-ray of the chest taken on September 18 showed the heart to be normal in size, and the previously described infiltration to be resolved (Figure 2). Except for mild orthopnea on the first three days the patient remained comfortable throughout his hospital stay. He was discharged in apparently good condition on the 18th hospital day.

DISCUSSION

Frederic G. Burke, M.D.: This patient had acute glomerulonephritis with heart failure and followed the rather typical course noted in a review of 90 cases in this hospital that was reported recently[1]. In this series of cases, skin lesions such as this patient presented were the second commonest preceding infection to the onset of the nephritic syndrome and was present in 10.2% of these cases.

Acute glomerulonephritis actually represents a generalized vascular disease involving principally the cerebrum, heart and kidneys, any one of which may be involved to a greater or lesser degree. While hematuria and albuminuria are the diagnostic criteria of nephritis, red blood cells may be present in relatively small numbers depending upon the amount and number of glomeruli damaged.

Acute glomerulonephritis has been the most common cause of congestive heart failure at the Children's Hospital for the past four years and is the principle cause of death when patients with this disease have a fatal outcome. Seventy-two percent of the patients in this hospital with acute glomerulonephritis have clinical evidence of myocardial involvement and the entire mortality rate of 3.3% was associated with this damage. Characteristically, if the child with acute glomerulonephritis associated with heart failure does not die, then they recover rapidly without any cardiac sequelae. The rapidity of change noted in the accompanying x-rays was characteristic of all the patients that we have seen. Cardiac compensation usually occurs upon bed rest alone although we do believe it is advisable in view of the attendant mortality due to heart failure that digitalis should be employed in each case. The mechanism of heart failure associated with acute glomerulonephritis is not exactly known but it is probable that there are several factors concerned with its production. The

two most important of these appear to be hypertension due to vascular spasm and toxic changes in the myocardium probably vascular in origin but independent of hypertension. Elevation of the blood pressure may represent a trigger mechanism which tips the damaged heart into congestive failure. While the vast majority of patients showing congestive heart failure will show an elevation of their blood pressure (95%) it is worth while to note that in our reported series 3 failed to demonstrate any *significant elevation* of pressure. One of the 3 cases who died in our series died of congestive failure with a blood pressure of 110/55.

The prognosis of this patient presented appears to be excellent and probably will fall within the group of 93% that will make a complete recovery.

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AURICULAR FLUTTER IN AN INFANT

Case Report No. 110

Charles Stiegler, M.D.

Herbert Glick, M.D. E. J. 47–4714

This patient, a full term, colored male infant, was born on December 27, 1946 at Gallinger Hospital after a 12 hour labor. The type of presentation and delivery were not known. The birth weight was 10 pounds 13 ounces. There was no neonatal cyanosis, jaundice or convulsions. Both mother and father were living and well and there were no previous pregnancies nor familial disease. The infant left Gallinger Hospital at the end of 2 weeks and was put on formula, presumably taking its feedings well. At the end of one month, the baby was seen at the well-baby clinic and was found to be in good health.

From the age of two weeks up until the present time, nothing abnormal was noticed by the mother except that the baby breathed somewhat rapidly. However, there were never any feeding problems, cyanotic spells, urinary or gastro-intestinal disturbances. Physical development had been essentially within normal limits.

Four days prior to admission to Children's Hospital the baby "caught a cold" and was slightly feverish; breathing became more difficult and respirations more rapid. The infant was seen by a private physician and symptomatic measures were initiated. However, because of lack of improvement, the patient was brought to the hospital on May 8th, 1947.

Admission examination revealed an acutely ill five months old colored female infant with moderate respiratory embarrassment. The temperature was 102°, respirations 100 and apical heart rate 160–180. There was marked dullness over the left upper lobe extending into the axilla. The breath sounds were diminished over this area and scattered fine crackling rales were heard. The percussion note was hyperresonant over the left lower lobe, and the breath sounds were barely audible over this area. Examination of the right lung by percussion and auscultation revealed no abnormalities other than scattered rhonchi. The heart was markedly enlarged to the left and right. There were no thrills. The ventricular rate varied from 160 to 180 beats per minute; the rhythm was irregular. There was a slightly harsh, grade 2 systolic murmur heard over the precordium; the murmur was loudest along the left sternal border, but more exact localization was not possible. The liver edge was palpable 2 cms. below the left costal margin. The patient was not cyanotic. Electrocardiographic examination showed an auricular flutter; the auricular rate was 320 per

minute, the ventricular rate 160 per minute and findings suggestive of right ventricular hypertrophy were present (see Fig. I) Urinalysis was not remarkable and a hemogram showed only a mild anemia.

The patient was placed in an oxygen tent because of the respiratory embarrassment and digitalization was begun to increase the degree of

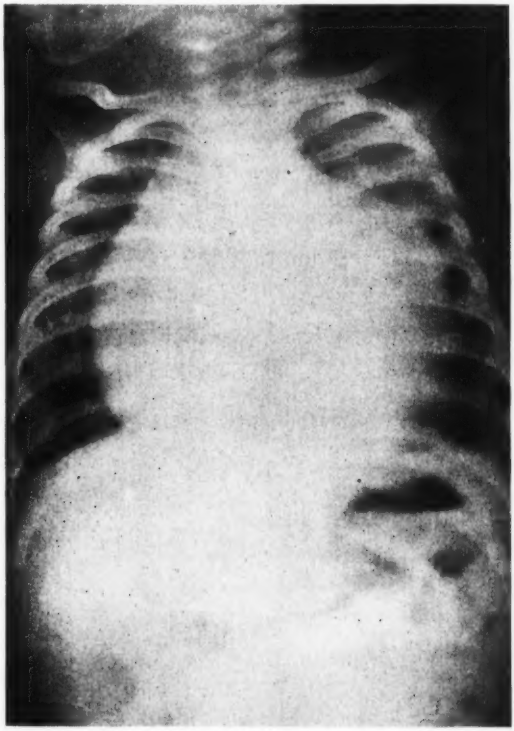

FIG. I. E. J. X-ray of the chest showing the greatly enlarged heart and abnorma contour probably due to interatrial septal defect.

auriculo-ventricular block present. The impressions at the time of admis sion were:

1. Congenital heart disease
2. Auricular flutter
3. Congestive failure
4. Possible atelectasis of the left lower lobe
5. Possible pneumothorax, left lower lobe

Radiographic examination of the chest in the AP and lateral positions on May 9, 1947 revealed the cardiac contour to be greatly enlarged to the left and right; an area of pneumothorax was present at the left base. The trachea was displaced dorsally. The liver was only slightly enlarged.

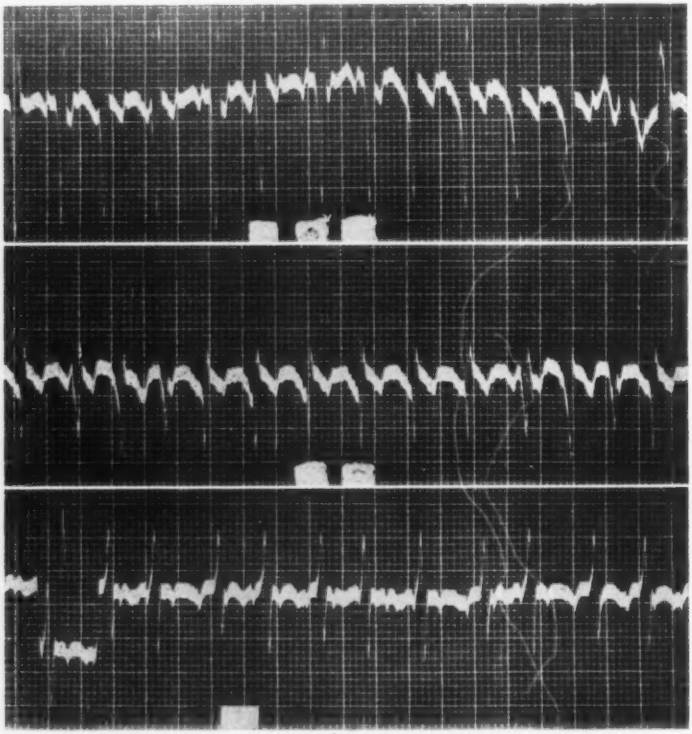

FIG. II. E. J. Auricular flutter with Auricular rate of 320 with nearly constant ventricular rate of 160, Axis within normal limits.

Prominent S wave in lead 1, prominent Q wave in lead 3.

T wave rather low but upright in lead 1, not clearly identified in lead 2-3, probably upright.

Interpretation: Auricular flutter with 2-1 block.

Probably right ventricular hypertrophy.

Cardiac consultation with Dr. B. J. Walsh was obtained and it was considered that a large inter-atrial septal defect was present and was the basis of the auricular flutter.

The administration of digitalis to the patient was increased gradually during her hospital stay to a maximum 6 drops of tincture of digitalis

every 6 hours on May 31st. Throughout this period, the auriculo-ventricular block varied from a 2 to 1 to a 4 to 1 block. Clinically, the patient showed mild improvement as indicated by the partial alleviation of the respiratory embarrassment, but it was felt that this was largely due to subsidence of the pulmonary findings as evidenced by a radiographic examination of the chest May 23, 1947. She still required oxygen therapy periodically. Because of the possibility of a rather protracted course, the patient was transferred to the Crippled Children's service at Gallinger Hospital. At this time she was receiving tincture of digitalis 3 drops every 4 hours, and the most recent electrocardiographic record (June 6, 1947) showed an auricular flutter with a 2 to 1 A-V block.

DISCUSSION

Bernard J. Walsh, M.D.: As indicated in the case history, this child entered the hospital with pulmonary infection and very probably some degree of heart failure. The rapid, changing apical heart rate was shown by electrocardiogram to be due to auricular flutter with varying block, mostly two to one. The cardiac contour, the unusual degree of right axis deviation by electrocardiogram, and the presence of auricular flutter indicate, I believe, that this child has congenital heart disease with an inter-atrial septal defect. This patient is the youngest one we have seen with auricular flutter. We have seen two children a few seeks younger than this patient who had auricular fibrillation and who proved to have inter-atrial septal defects.

Our first problem here, so far as the heart is concerned, as with all patients who have auricular flutter and two to one block, is to increase the auriculo-ventricular block, if possible, by digitalis, so that the ventricular rate will be one-third or one-fourth of the auricular rate. We are much less concerned with the auricular activity since if we can keep the ventricular rate within bounds the high auricular rate will cause little or no difficulty to the patient. We have thus far succeeded in causing four to one block with digitalis, but we have been unable to maintain this degree of auriculo-ventricular block without causing the patient to have nausea and vomiting due to too much digitalis. The outlook here for the baby's life is not good, for while most inter-atrial septal defects are well tolerated and permit quite normal growth and development, some are so large as to bring about heart failure in the first few weeks or months of life. The cardiac size and contour would indicate that the right auricle and right ventricle are greatly enlarged, and on this fact alone we canot expect life to continue for more than a few months.

Auricular flutter is a rare arrhythmia in childhood and is a very unusual arrhythmia at any age. Hoyer and Lyon found only ten instances of

auricular flutter in infants and children reported in the previous thirty years and added one case of their own. In only 3 of the 11 cases was a congenital cardiac defect present, and these three cases were the only fatal cases in the group. The prognosis in these patients is really related to the type and extent of the underlying cause for the flutter rather than to the arrhythmia itself.

ADDENDUM

Because of unsatisfactory home conditions and the need for continued close medical care, the child was transferred to the Crippled Children's Service at Gallinger Hospital on May 30th. Her course was slowly downhill. We were unable to maintain the ventricular rate below 160 beats per minute without causing nausea and vomiting. She failed to make satisfactory weight gain because of poor appetite. She died on August 30th after more than a week of considerable heart failure chiefly right-sided in type.

Autopsy confirmed the diagnosis of an inter-atrial septal defect. The heart was moderately enlarged, making up 80 per cent of the transverse diameter of the chest. When the chest plate was removed, it was apparent that the right auricle and right ventricle were greatly dilated and were much larger than the left heart chambers. The pulmonary artery was greatly dilated and was about twice the size of the aorta. The heart weighed 125 gms. The right ventricular wall was 7 mm. thick, the left ventricular wall 9 mm. The only defect in the heart other than for the dilatation and hypertrophy of the chambers as described was an opening in the inter-auricular septum measuring 8 by 5 mm.

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Hoyer, B., and Lyon, R. A.: Auricular Flutter with Block in Children. Am. J. Dis. Child., 1946, **72**, 734.

ECTOPIC KIDNEY SIMULATING A SURGICAL ABDOMEN

James Perrett, M.D. J. A. 47–9980

J. A., a three year old white male, was admitted to Children's Hospital on September 26th because of abdominal pain and vomiting of fourteen hours duration. The child was apparently well until the early morning hours of the day of admission when he complained of severe cramps and vomited. The abdominal cramps and vomiting continued through the day. In the evening a physician examined the boy and advised hospitalization because appendicitis could not be excluded on physical examination. There was no history of injury or previous similar episodes. The child presented no other complaints.

The past history was irrelevant. There had been no serious illnesses or operations.

Physical examination on admission showed a well developed and nourished white boy who appeared to be in moderate distress. Temperature was 99.8°, pulse 98, and respirations 22. The tonsils were large and cryptic. The ears, heart, and lungs were normal. A mass two inches in diameter was seen in the right lower abdomen below the umbilicus and just lateral to the midline. There was slight voluntary resistance to palpation in this region. The mass was freely movable, had a rubbery consissistency and could not be definitely separated from the rectus abdominus muscle. On digital rectal examination the mass could be moved about freely and was not attached to any identifiable organ.

The hemogram on admission showed a hemoglobin of 10 gms.; the white cell count was 8,700 with 52% neutrophils, 49% lymphocytes and 3% monocytes. The urine was clear, acid and contained 5 mgms.% albumin; there was no sugar, acetone or diacetic acid. An occasional leukocyte was noted in the sediment.

An ice bag was placed on the abdomen and the child promptly fell off to sleep. By morning all symptoms were abated. The child drank and retained clear liquids. His temperature was 100° rectally. The mass remained clearly visible. Palpation of the right lower abdominal quadrant was not painful and the findings were similar to those on admission. The possibility of a bladder diverticulum was considered. Catheterization of the bladder yielded 1½ ounces of turbid urine. Pressure on the mass did not increase the flow of urine and after the bladder had been emptied the mass was unchanged in size, shape or consistency. The urine was cultured and subsequently reported sterile. Routine analysis of this urine was within normal limits. A flat x-ray plate of the abdomen showed a radiodensity the size of a grapefruit lying in the midline just above the pelvis.

During the next few days the child was watched carefully. He was given the usual diet for his age and appeared moderately comfortable. On the second hospital day the abdominal mass disappeared from sight but a mass was palpable in the lower abdomen in the same position as the previously visible mass. On the third hospital day the mass reappeared.

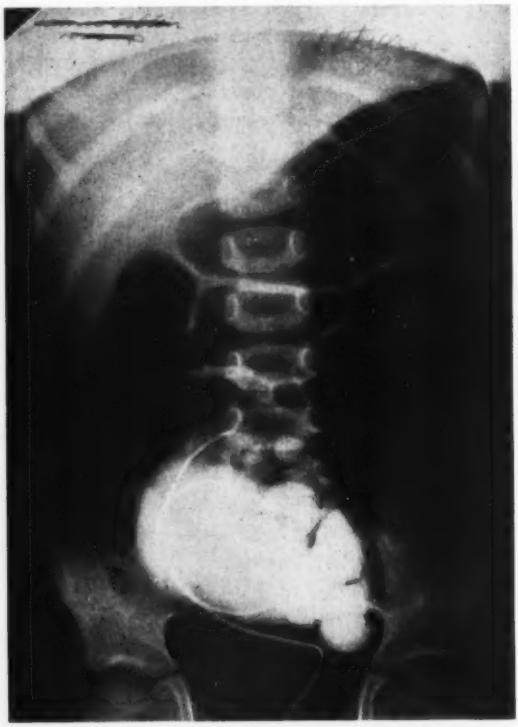

FIG. I. J. A., Retrograde pyelogram showing the ptotic hydronephrotic left kidney.

There were no symptoms related to the appearance and disappearance of the mass.

On the seventh hospital day an intravenous pyelogram was done. On the scout film the same radiodensity seen earlier was visualized in the same position. At the end of 4 minutes the right pelvis, calices and proximal portion of the ureter were visualized. No dye was seen on the left side. At the end of 10 minutes the findings were the same. At the end of 20 minutes the right kidney was emptying, the bladder was partially out-

lined by dye and no dye was seen on the left side. At the end of 45 minutes the right kidney was free of dye, the bladder well outlined and appeared normal; no dye was seen on the left side. Because of these findings, cystoscopy and retrograde pyelography on the left side were done three days later. The cystoscope was passed easily. The neck of the bladder, the bladder mucosa and the ureteral orifices appeared normal. Indigo carmine was injected intravenously and appeared at the right ureteral orifice in good concentration at the end of 5 minutes. At the end of 10 minutes faint traces of dye appeared at the left ureteral orifice. A catheter was passed 25 centimeters up into the left ureter without difficulty. At this time no mass was visible but a rubbery mass as described earlier was palpable in the lower abdomen. During the injection of radio-opaque dye into the catheter the mass could be seen to enlarge progressively in the right lower quadrant. X-ray study showed the ureteral catheter coiled $2\frac{1}{2}$ times on itself and a large hydronephrotic left kidney occupying the space of the previously described mass. A specimen of urine collected from the left ureter was cultured and subsequently reported sterile.

On the 22nd hospital day the abdomen was explored through a 6 cm. suprapubic incision. A cystic retroperitoneal mass was identified. After dissecting the peritoneum a greatly distended renal pelvis with a small atrophic kidney was removed. On gross examination, the kidney appeared pale and had a leathery surface. A section through the long axis showed the cortical and medullary substances destroyed and replaced by cyst-like spaces. The pelvis measured 6 x 3 x 2.5 cm. and was composed of thick fibrous tissue. The ureter was thickened. The microscopic appearance was that of chronic pyelonephritis secondary to hydronephrosis.

The post-operative course was uneventful and the child was discharged on the tenth post-operative day.

DISCUSSION

Renal ectopia is not an infrequent abnormality. Radiologists encounter the condition often as seen in intravenous pyelography. Urologists frequently find it as the cause of urinary tract infection and occasionally as the cause of hypertension. Most of the cases reported in the literature have occured in adults. There are only six cases of renal ectopia on record at this hospital. Of these six, three were diagnosed clinically and three at autopsy. All cases of ectopia in this hospital have been complicated by infection.

An interesting clinical observation in this case was the rapid appearance and disappearance of an abdominal mass. This finding is strongly suggestive of intermittent hydronephrosis. This was in fact the basis of the observation here.

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CLINICO-PATHOLOGICAL CONFERENCE

Directed by: E. Clarence Rice, M. D., and Fernando Leyva, M.D.
Assisted by: Adrian Recinos, M.D., and Harold Bischoff, M.D.
By Invitation: Philip Caulfield, M.D.

Adrian Recinos, M.D. J. H. 42–10081

J. H., a five month old white male infant, was admitted to Children's Hospital for investigation of an abdominal mass first noticed in the dispensary. He had been taken to the dispensary because of vomiting for ten days and constipation for two months.

The patient was delivered uneventfully at term of a primigravida after a normal pregnancy. The father and mother were in good health. The birth weight was 5 pounds 13 ounces. The baby was breast fed until two and one half weeks before admission, and then a formula of evaporated milk, water and Karo syrup was instituted. One week later and for the ten days preceding hospitalization he began to vomit forcibly once or twice a day. The vomiting was not related to feedings and the nutrition remained good. Supplementary foods and vitamins were adequate. For the last two months the baby had been constipated, averaging a bowel movement every third day. However, the stools had been soft in consistency and normal in color. There was no history of fever or excessive crying.

The patient was a well-nourished and developed infant in no apparent discomfort. The temperature was 100.8° F., and the weight 14 pounds 4 ounces. Except for a mild injection of the throat the positive findings were limited to the abdomen. The abdomen was slightly distended. There was a large, indurated, nodular mass extending from the left flank below the umbilicus to the mid-clavicular line on the right side. The superior border of the mass was four centimeters below the right costal margin and extended upward beyond reach above the left costal margin. The mass was freely movable and apparently not attached to the liver. It was not tender and did not feel cystic.

The initial blood count revealed a hemoglobin of 11 grams, erythrocytes 3,670,000, leucocytes 10,000 with 53% lymphocytes. Subsequent blood counts were approximately the same. Repeated urinalyses contained 0 to 30 milligrams of albumin and in most specimens a few to a moderate number of leucocytes with occasional clumps. Hyaline and finely granular casts were reported twice. E. coli was cultured from the urine. The blood culture, tuberculin and Kahn tests were negative.

X-ray examination of the chest revealed some increase in fibrosis throughout both lung fields more marked on the left side. A flat plate of the abdomen revealed the following: "The kidneys, though not clearly outlined, are believed to be somewhat enlarged. On the left side of the abdomen there is a dense shadow which displaces the stomach upwards and towards the right. The psoas muscles are fairly well outlined." The results of an intravenous pyelogram are as follows: "At the end of two minutes very little dye can be seen in either pelvis or their calyces. At the end of eight minutes both pelves, the calyces on the right side and the upper portions of the right ureters are visualized. The right side seems to be entirely normal. On the left side no calyces can be outlined. The left kidney is a bit larger than the right. At the end of eighteen minutes both kidneys are emptying and there is a good deal of dye in the bladder. At the end of thirty-five minutes faint calyces can be made out on the left side. The stomach is still displaced upwards and towards the right." A barium enema revealed no definite abnormality of the colon per se. The transverse colon is displaced downward and towards the right by the mass in the left abdomen which is extra-colonic. The ascending colon and the caput coli could not be filled. A gastro-intestinal series revealed the following: "The stomach is displaced upward and towards the right, but is normal in size. The barium empties readily into the duodenum. At the end of four hours ninety percent of the barium has gone out of the stomach. The head is in the transverse colon and the tail in the stomach. All the abdominal viscera are displaced towards the right by the mass in the left abdomen which is believed to be extra-gastro-intestinal."

There was an irregular fever reaching 104°F., on several occasions. Vomiting was slight but persistent and there was mild constipation. The baby lost one and one-half pounds. On the eighteenth hospital day examination of the urine was normal. The next day an exploratory laparotomy was performed.

DISCUSSION

Philip Caulfield, M.D.: The very fact that this patient is a child immediately eliminates many conditions found in the abdomen. An aneurysm can virtually be ruled out. In an adult a large ovarian cyst or a malignant cyst adherent to all organs would be suspected. These conditions can be immediately eliminated.

What conditions in a child can present this picture? The patient has a large nodular mass extending from the left flank and occupying for the most part the left side of the abdomen. By x-ray this mass displaces the stomach upwards and the transverse colon downwards and forwards. This makes me think that the mass is in back of the transverse colon pushing

the stomach up. An extra peritoneal mass found in a child immediately makes us consider a congenital rest. However, we know from experience at autopsy that congenital rests are uncommon in this location. We should consider a cyst. In this condition a secreting surface is left behind in an area where it shouldn't be. This surface might be mucous membrane, peritoneum, or serosa. Peritoneum in an abnormal position, such as hydrocele, may secrete an abnormal amount of fluid. Omental and mesenteric cysts and pseudo-cysts of the liver are not uncommon. The omental cysts arise from either the greater or lesser omentum and grow rapidly. Since they arise between the layers of the omentum they secrete lymph and since there is no outlet as in the ordinary lymphatic system, cysts are formed. The fluid is sometimes not true lymph but serous resembling plasma, but more frequently the cysts contain true lymph or chyle. These cysts can become of tremendous size. The sense of touch through the abdominal wall is notoriously misleading. Cystic tumors feel solid and solid tumors feel cystic. Chylous cysts feel solid more frequently than serous cysts. For these reasons I hesitate to diagnose this case. Real chylous cysts are found in the jejunum. This could be the patient's case from the location. These chylous and serous cysts are true cysts and are easy to separate from the gut. Lines of cleavage are easily found and the gut need not be entered.

Another cyst in the abdomen much more difficult to handle is an enteric cyst arising from the intestinal wall itself or even from a Meckel's diverticulum. I had a child with a cyst the size of a fist arising from a Meckel's. It had bleeding from the rectum for at least two weeks. The child had an intussusception. Enteric cysts occur when folks of mucous membrane become redundant and close off. A huge enlarging mass results as the mucous membrane continued to secrete. The cyst may become so large that it "flops" around the abdomen and the gut may become caught on it causing obstruction. This patient's cyst would have to be growing since birth, a period of five months, and if the gut had wrapped around it, he would have certainly had intestinal obstruction. Congenital malformations of the bile duct might be considered. However, the mass is not connected to the liver and there is no pain or jaundice.

Question. Would you suspect a Wilm's tumor?

Dr. Caulfield. A Wilm's tumor should be considered. It is caused by foetal rests which become malignant. However, a Wilm's is not freely movable and usually is not of such tremendous size as this one. A fairly normal pyelogram also makes this an unlikely possibility.

Question. What about a neuroblastoma?

Dr. Caulfield: They are highly malignant and metastasize early, particularly to the lungs. A negative chest plate, I think, should help to rule out

a neuroblastoma. My belief is that this is a chylous or serous cyst of either omental or mesenteric origin. These cysts are sometimes dumbbell shaped. That may explain why this mass felt nodular.

Question: How often do you find solid tumors of the mesentery or omentum?

Dr. Caulfield: They are quite rare, I have never seen one. Cystic tumors are more common, but I will not say that this cannot be a solid tumor. They can occur arising from adenomatous or connective tissue.

PATHOLOGICAL REPORT

Fernando Leyva, M.D.: We agree with Dr. Caulfield that solid tumors of the mesentery or omentum are extremely rare. Cystic tumors in these structures are far more common. This is the first and only solid tumor of mesenteric origin recorded in this hospital. At operation a large indurated, nodular mass arising from the lesser peritoneum and adherent to the stomach and transverse colon was easily dissected and removed. Grossly this tumor was a firm, nodular rubbery mass with a shiny yellow external surface and a glistening cut surface. It weighed 212 gms. and measured 11.0 x 10.0 x 4.0 cms. Microscopically the peripheral portion of the tumor was rather poor in cells, most of these being spindle shaped with a great deal of collagen present. In the interior there was a tendency toward breaking down with the presence of phagocytic histiocytes. The cells of the tumor were oval or elongated, sometimes with fairly extensive processes and rather small compact nuclei. No giant cells or mitotic figures were seen and no large nuclei with nucleoli. The tumor itself was very dense and the connective tissue stroma was wrapped in broad sweeping lines without much interweaving of fasciculi. The tumor appeared to be benign and of mesodermal origin, and was probably a fibroma with collagenous changes.

The patient is living and well four years after the operation.